

"said strain sensor is sensitive to at least 1 $\mu$ m strain".

Independent Claim 14 has been amended to more narrowly recite the invention contained therein. The newly amended independent Claim 14 further recites the limitation of:

"Said strain sensor is sensitive to at least 1 $\mu$ m strain".

**Objection to Oath/Declaration**

The Oath or Declaration is objected to by the Examiner as being defective. The Examiner contended that the Oath or Declaration is defective because the signatures, the dates, and the residences of the inventors are unreadable.

The Applicants respectfully submit that after examining the Oath/Declaration, the Applicants fail to discover any part of the document as unreadable. A copy is hereby attached for the Examiner's review. Should the Examiner still conclude that the document is unreadable, the applicants will be gladly supplying a new Oath/Declaration.

**Objections to the Drawings**

The drawings are objected to for Figures 5A-5C being mismarked as "prior art". A corrected drawing and a red-lined copy are hereby attached for the Examiner's approval.

The drawings are further objected to for failing to show the reference numeral "62". The reference numeral "62" has been added to Figure 3.

The drawings are objected to for showing reference numeral "54" which is not identified in the specification. The reference numeral "54" has been removed from Figures 1B, 1C and 3. A corrected copy and a red-lined copy are hereby attached for the Examiner's approval.

**Objections to the Specifications**

Numerous typographical errors are objected to by the Examiner. These typographical errors have been corrected to alleviate the Examiner's objections.

**Claim Rejections Under 35 USC §112**

Claim 11 is rejected under 35 USC §112, second paragraph,

as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim 11 has been amended to alleviate the Examiner's rejections.

**Claim Rejections Under 35 USC §102**

Claims 1, 4-7 and 14-19 are rejected under 35 USC §102(e) as being anticipated by Park, et. al., (Publication) '088. It is contended that Park, et. al., '088 substantially discloses the present invention Wafer Pickup System.

Independent Claims 1 and 14 have been amended to further recite the limitation of "said strain sensor is sensitive to at least 1 $\mu$ m strain".

The Applicants respectfully submit that the newly added limitation to independent Claims 1 and 14 is not taught or disclosed by Park, et. al. '088.

The rejection of Claims 1, 4-7 and 14-19 under 35 USC

§102(e) based on Park, et. al. is respectfully traversed. A reconsideration for allowance of these Claims is respectfully requested of the Examiner.

**Claim Rejections Under 35 USC §103**

Claims 2-3, 8-13 and 20 are rejected under 35 USC §103(a) as being unpatentable over Park, et. al., in view of Piper '797. It is contended that while Park, et. al., does not show the sensor being of piezoelectric sensor, such is disclosed by Piper for detecting the touching of a wafer.

The rejections of Claims 2-3, 8-13 and 20 under 35 USC §103(a) based on Park, et. al., and Piper is respectfully traversed.

Claims 2-3 depend on the newly amended independent Claim 1 which now further recites the limitation of "said strain sensor is sensitive to at least 1 $\mu$ m strain".

Independent Claim 8 recites the limitation of "a piezoelectric sensor mounted on said bottom surface for detecting any undesirable touching with wafers".

Claim 20 depends on the newly amended independent Claim 14 which further recites the limitation of "said strain sensor is sensitive to at least 1 $\mu$ m strain".

The Applicants respectfully submit that such limitations are not taught or disclosed by Park, et. al., Piper, either singularly or in combination thereof.

Moreover, the criticality of using a strain sensor that has sensitivity to at least 1 $\mu$ m strain is presented in the specification at Page 13, Paragraph 0036:

"The strain sensor should be sensitive to very small strains, such as strains as small as 1 $\mu$ m. One of such suitable strain sensors to be utilized by the present invention wafer blade may be a piezoelectric thin film sensor."

Furthermore, at Page 14, Paragraph 0037:

"For instance, in the present invention

application of a piezoelectric element or a piezoelectric thin film sensor on a bottom surface of a wafer blade **any minute contact with a wafer can be detected** and an alarm can be sent to an alarm panel located in a central process controller."

The rejection of claims 2-3, 8-13 and 20 under 35 USC §103(a) based on Park, et. al., and Piper is respectfully traversed. A reconsideration for allowance of these Claims is respectfully requested of the Examiner.

Based on the foregoing, the Applicants respectfully submit that all pending Claims, i.e., Claims 1-2 and 4-20 are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version With Markings To Show Changes Made".

In the event that the present invention is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In The Specification

Paragraph 007 has been amended as follows:

007 Figures 1B and 1C illustrate another typical wafer blade 30 used in transporting 200 mm wafers. The wafer blade 30 generally has a dimension of 150 mm length and 70 mm width. The wafer blade 30 is constructed of a blade body 32 of generally elongated rectangular shape and formed of a rigid metallic material such as aluminum or stainless steel. At a base portion 34 of the blade body 32, mounting means 36 which are screw holes is provided for attaching to a robot arm (not shown). Figure [4] 1B shows the back side surface 38 of the blade body 32 which further contains a vacuum passageway 42, i.e., a channel formed in the blade body 32 and sealed by a cover 44. At a base portion 34 of the blade body 32, the vacuum passageway 42 is in fluid communication with an external vacuum source (not shown) through a vacuum inlet 46. At the front portion 48 of the blade body 32, the vacuum passageway 42 is in fluid communication with

a recessed vacuum port 50 through a vacuum opening 52.

A side view of the blade body 32 is shown in Figure 1C.

There is still another type of wafer blade with the same shape as Figure 1B, which is made of ceramic or [quarts] quartz without vacuum passageway.

In the Claims

Claim 3 has been canceled without prejudice.

Claim 1 has been amended as follows:

1. (Amended) A wafer blade for picking up wafers on a top surface of the blade and for detecting any undesirable contact with wafers on a bottom surface of the blade comprising:

a blade body of generally elongated shape having a top surface and a bottom surface parallel to each other; and

a strain sensor mounted on and at least partially covers said bottom surface of the blade body, said strain sensor is sensitive to at least 1  $\mu$ m strain.

Claim 11 has been amended as follows:

11. (Amended) A wafer blade for picking up wafers according to claim 8, wherein said blade body is fabricated of a metal or a ceramic [that has the rigidity at least that of aluminum].

Claim 14 has been amended as follows:

14. (Amended) A wafer pick-up system comprising:  
a wafer blade having a blade body of generally elongated shape; said blade body having a top surface and a bottom surface;  
a strain sensor mounted on said bottom surface of the blade body, said strain sensor is sensitive to at least 1  $\mu$ m strain; and  
an alarm device for receiving a signal from said strain sensor when a strain is detected and for sending an alarm signal to alert an operator.